

REMARKS/ARGUMENTS

Claims 1 - 5 and 7 - 20 remain in the case and are presented for reconsideration as amended. The limitations of Claim 6 have been incorporated into independent Claim 1, and Claim 6 has been cancelled. Claim 1-5 and 7-20 have been amended to obviate the indefinite rejection of them, and no claim has been added. In this Response, Applicant has also amended most of the paragraphs of the specification to remove the grammatical and idiomatic errors so as to provide a specification that is in full, clear, concise, and exact terms.

Applicant has thoroughly reviewed the outstanding Office Action including the Examiner's remarks and the references cited therein. The following remarks are believed to be fully responsive to the Office Action and, when coupled with the above amendments, are believed to render all claims at issue patentably distinguishable over the cited references.

CLAIM OBJECTIONS

With respect to Page 8 of the Office Action, the Examiner stated that Claim 6 would be allowable if rewritten in independent form. Accordingly, Applicant added the limitation of Claim 6 “wherein said ball grid array package device comprises an embedded heat slug with a cavity therein” into an amended Claim 1, and cancelled Claim 6.. Thus, Applicant submits that Amended Claim 1 is now in condition for allowance. Therefore, the objection to claim 6 has been obviated.

CLAIM REJECTIONS- 35 U.S.C. SECTION 112, second paragraph

With respect to Page 2 through Page 3 of the Office Action, the Examiner rejected the specification under 35 U.S.C. 112, first paragraph, which requires the specification to be written in “full, clear, concise, and exact terms.”

The Examiner is of the opinion that the specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Thus, Applicant amended the specification of the original filed application so that it is rewritten in full, clear, concise, and exact terms, and the rejection of the specification has been obviated.

CLAIM REJECTIONS- 35 U.S.C. SECTION 112, second paragraph

With respect to Page 3 through Page 4 of the Office Action, the Examiner rejected Claims 1-20 stand under 35 U.S.C 112, second paragraph.

The Examiner is of the opinion that claims 1-20 is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 has been deleted because the limitations of that claim have been added into Claim 1, thus, the rejection of Claim 6 is obviated.

Applicant has been amended the Claim 1-5 and 7-20 of the original filed application. The main change is that the unnecessary statement "said heat sink device used for ball grid array package with said modified embedded heat slug comprises" has been deleted in independent Claims 1, 10, and 16, and the word -- device -- has been added after "ball grid array package". Applicant has reviewed the entire claims to be definite for particularly point out and distinctly claim the subject matter. Therefore, it is submitted that the rejections of the claims as being indefinite have been obviated.

CLAIM REJECTION-35 U.S.C SECTION 102 (b)

With respect to Page 4 of the Office Action, the Examiner rejected Claims 1-3, 8-9, and 16-20 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,154,365 to Pollard, II et al.

This rejection is respectfully traversed on the basis that Pollard '365 does not disclose that the "..., **said ball grid array package device having an embedded heat slug with a cavity thereon**" as recited in amended claim 1.

The Examiner is of the opinion that Pollard '365 discloses a heat sink device that is used for

an integrated circuit package. Pollard focuses on a spring fixture that attaches a heat sink to a substrate for multiple cycle assembly/disassembly. Pollard '365 discloses "the heat sink 42 may have fins that extend from a pedestal, four attachment holes, and may be pressed into the integrated circuit package to provide a thermal path for the heat generated by the integrated circuit" (col. 2, lines 38-42), and "the heat sink 42 may have eight or more fins 43" (col. 2, lines 42-43). Pollard '365 merely disclosed that the heat sink (42) has fin and holes, which did not disclose **"said ball grid array package device having an embedded heat slug with a cavity thereon"**. The 'cavity' of the present invention can reduce the thickness of the molding compound 26 when the molding compound 26 is molded into the ball grid array package device (page 11, lines 7-9). Thus, Pollard '365 does not disclose the "cavity" to reduce the 'thickness' of the molding compound 26 that is mold into the ball grid array package device.

In addition, this rejection is respectfully traversed on the basis that Pollard '365 in view of do not disclose that the "a first heat sink assembly with a 'conductive protruding block,..." as recited in amended claim 16.

Pollard focused on a spring fixture that attaches a heat sink to a substrate for multiple cycle assembly/disassembly. Pollard '365 disclosed "the heat sink 42 may have fins that extend from a pedestal, four attachment holes, and may be pressed into the integrated circuit package to provide a thermal path for the heat generated by the integrated circuit" (col. 2, lines 38-42), and "the heat

sink 42 may have eight or more fins 43” (col. 2, lines 42-43). Pollard ‘365 merely disclosed that the **heat sink (42) has fin and holes, which did not disclose “a conductive protruding block on a backside of said first heat dissipating structure”**. The ‘conductive protruding block’ contacts with the cavity of the ball grid array package device with modified embedded heat slug to increase the heat dissipating efficiency, when the integrated circuit is operated to generate a large of heat in the computer. According to above discussions, Applicant believed that Pollard ‘365 cannot anticipate the present invention.

CLAIM REJECTION-35 U.S.C. SECTION 103 (a)

Claim 4 stands rejected under 35 U.S.C. 103 (a) as being unpatentable over Pollard in view of Goodwin (U.S. Patent No. 6,545,879).

The Examiner is of the opinion that Goodwin discloses all of the claimed package device, except for a protruding block on the backside of the first heat dissipating structure.

Goodwin ‘879 disclosed that the “a generally rectangular pedestal 56 that extends downwardly from the underside of the heat sink abuts the top surface of the semiconductor die 14” (col. 4, lines 26-28).

Nevertheless, the material of the protruding block (extending pedestal) is different between the present invention and Goodwin ‘879. Respect with the present invention, recited “wherein a conductive protruding block on the backside of said first heat dissipating structure” as in amended claim 4. Goodwin ‘879 did not disclose clearly that the material of “extending pedestal”. Even the

“extending pedestal” is on the backside of the heat sink, but the Applicant cannot infer from the disclosure of Goodwin ‘879 to obtain the “material” that is “conductive material”. Thus, Applicant submits that Goodwin ‘879 cannot achieve the present invention.

Claims 5 and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Pollard in view of Dozier (U.S. Patent No. 5,473,510).

The combination of the disclosure of Pollard in view of Dozier did not disclose the recitation that “a first heat sink assembly having a first heat dissipating structure, which has a conductive protruding block on a backside of said first heat dissipating structure,...” and “a printed circuit board having a ball grid array package device thereon, said ball grid array package device having an embedded heat slug with a cavity thereon” as recited in amended claim 1. Although Dozier disclosed “conductive adhesive tape for adhering the heat sink and the integrated circuit package device”, the combination of the disclosure of Pollard in view of Dozier lack for disclosing the “conductive protruding block on a backside of said first heat dissipating structure (as heat sink 42 of Pollard disclosed)”. Therefore, Applicant believed that the combination of the disclosure of Pollard in view of Dozier cannot achieve the present invention.

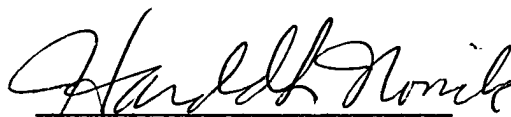
CONCLUSION

In the light of the above amendments and remarks, Applicant respectfully submits that all pending Claims 1-5 and 7-20 as currently presented are in condition for allowance. Applicant has thoroughly reviewed the art cited but not relied upon by the Examiner. Applicant has concluded that

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these references do not affect the patentability of these claims as currently presented. Accordingly,
reconsideration of this application as amended is respectfully requested.

Respectfully submitted,
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